Cost of Producing
TOMATOES
in Hawaii

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SUMMARY

1. This report presents findings of a survey carried out in June and July, 1962, to determine the cost of producing tomatoes in Hawaii.

2. Between 1950 and 1961 the State of Hawaii's harvested acreage of tomatoes fell by more than half--from 603 to 288.

3. Oahu's harvested tomato acreage dropped most from 223 (1950) to only 55 (1961); Maui's fell from 240 to 104; Kauai's from 57 to 25 while the island of Hawaii's area of tomatoes harvested increased from 77 (1950) to 100 (1961).

4. State production of tomatoes remained around 5 million pounds per year between 1950 and 1961 as rising yields (up from about 10,000 pounds to 18,000 pounds, per acre) compensated in part for the drop in area harvested.

5. Hawaii is not yet self-sufficient in tomato production although in 7 out of the 12 months of 1961, locally grown tomatoes accounted for 75 percent or more of total local supplies. Dependence on shipments from the U. S. Mainland is most pronounced in late fall.

6. Island tomato production is mostly a small-scale operation based on family labor.

7. Prices received by farmers for tomatoes fluctuate twice as much (in percentage terms) as retail prices as a result of the "stickiness" of marketing margins in the Honolulu vegetable market.

8. Typical production cost per acre (18,000 pounds, packed) on the island of Hawaii was $1,392 (7.7 cents per pound).

9. Typical marketing costs per acre (18,000 pounds, packed) on produce shipped from Hawaii to Honolulu was $978 (5.4 cents per pound).

10. Farm labor amounted to $701 per acre or half of total production costs.

11. A summary of selected cost (and related) factors influencing the location of tomato production in Hawaii is given in this report.

12. The relationship between harvested yield per acre and cost per pound, of tomatoes, is demonstrated. Typical figures are (at the farm) 10.8 cents per pound for a 12,000-pound (per acre) crop to 6.1 cents per pound for a 30,000-pound crop.

13. Attention is focused on the need for reduction in costs of production and marketing if Hawaii is to enter the West Coast winter vegetable market successfully.

14. Continued research efforts are needed to develop tomatoes with more extensive disease resistances which still yield heavy crops of good quality.

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A cluster of an experimental tomato variety recently developed by University of Hawai'i scientists. (Photo by Masao Miyamoto.)

Cost of Producing Tomatoes in Hawaii

J. A. Mollett[1/]

INTRODUCTION

This report presents findings of a survey carried out in June and July, 1962, to determine the cost of producing tomatoes in the State of Hawaii. Tomato growing is a 12-month business in Hawaii. Production costs vary from season to season and in different locations. No one cost figure is completely typical. But data given in this report do give a reasonably accurate picture of the economics of tomato production under current conditions. This study is one of a series dealing with production costs of livestock products and crops in the State of Hawaii. It contains information of interest not only to island vegetable growers and wholesalers but also to state legislators and the general public. Tomatoes in Hawaii are a crop with a promise of becoming an important export commodity to West Coast markets in winter. Cost is a vital factor in determining whether such a possibility becomes a fact. This report critically examines the present cost situation in island tomato production and the means of lowering costs if a successful winter export trade in island-grown tomatoes is to be established.

At the present time, local producers do not fully supply their home market.

SOME ECONOMIC FEATURES OF TOMATO PRODUCTION IN HAWAII

Table 1 shows the area, yield per acre, and total production of tomatoes in the major growing islands and in the State as a whole between 1950 and 1961. During this 12-year period the State's harvested acreage of tomatoes fell, in a somewhat uneven fashion, by more than half--from 603 in 1950 to 288 in 1961. The distribution by islands of the tomato crop has radically changed since 1950.

The acreage of tomatoes harvested annually on the island of Hawaii increased from 77 (1950) to 100 (1961) and to a peak of 133 in 1959. At the end of the 12-year period (1950-61) this island accounted for 35 percent of the total harvested area compared with only 13 percent in 1950. In contrast, Oahu's tomato acreage fell from 223 (1950) to only 55 (1961), or from 37 percent of the State's crop in 1950 to only 19 percent of the greatly reduced 1961 tomato acreage. Maui's tomato area fell from 240 acres (1950) to 104 acres (1961), its proportion of the State tomato acreage falling from 40 percent to 36 percent. Kauai's tomato area fell from 57 acres (1950) to 25 acres (1961) but its proportion of the State tomato area remained about 9 percent.

Current indications are that winter tomato production in the coffee-growing area of Kona (on Hawaii) is likely to expand considerably in the next few years. The relatively storm-free winter season of Kona favors this development. Low coffee prices also encourage the recent move there towards more diversified crop production.

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Table 1. Acreage, average yield per acre, and total annual production of tomatoes on Oahu, Hawaii, Maui, and Kauai, 1950-61

Year	Acreage harvested					Average yield per acre					Total production				
	Oahu	Hawaii	Maui	Kauai	State[1/]	Oahu	Hawaii	Maui	Kauai	State	Oahu	Hawaii	Maui	Kauai	State[2/]
	Acres				Acres	1,000 pounds				1,000 pounds	1,000 pounds				1,000 pounds
1950	223	77	240	57	603	8.0	12.3	7.0	8.8	10.0	1,780	950	1,680	500	4,960
1951	148	91	203	70	519	9.5	13.0	7.9	12.1	9.8	1,400	1,180	1,605	850	5,090
1952	161	64	141	69	448	12.1	13.5	9.6	11.7	11.3	1,945	865	1,350	810	5,080
1953	182	52	108	58	400	16.6	15.7	10.0	13.3	14.2	3,025	815	1,085	770	5,695
1954	253	76	87	65	481	12.0	11.4	10.0	9.8	11.8	3,030	870	1,130	640	5,670
1955	292	110	104	70	576	11.3	12.3	13.7	12.9	12.1	3,300	1,350	1,420	900	6,970
1956	185	100	120	46	468	12.6	13.0	12.7	15.8	13.0	2,335	1,300	1,520	725	6,080
1957	115	110	125	25	386	15.9	14.5	14.6	18.0	15.2	1,825	1,600	1,820	450	5,870
1958	119	111	145	43	424	17.5	10.5	14.4	23.8	15.2	2,085	1,165	2,085	1,025	6,455
1959	70	133	101	37	346	20.1	13.5	15.1	19.9	16.0	1,410	1,790	1,525	735	5,535
1960	66	114	90	30	305	17.3	14.1	18.1	23.5	17.0	1,145	1,610	1,625	705	5,170
1961	55	100	104	25	288	19.5	20.6	16.9	25.6	19.4	1,075	2,060	1,760	640	5,600

1/ Including Molokai's small tomato acreage.
2/ Including Molokai's production.

Source: Statistics of Hawaiian Agriculture (annual), Hawaii Cooperative Crop and Livestock Reporting Service, cooperating with United States Department of Agriculture, Agricultural Marketing Service.

The average State yield, per acre, of tomatoes increased almost twofold between 1950 and 1961, from about 10,000 pounds to about 18,000 pounds. Kauai's average yield went from only 8,800 pounds in 1950 to 25,600 pounds in 1961. The islands of Oahu and Maui had similar but somewhat less spectacular yield increases. The island of Hawaii's average tomato yield at 12,700 pounds per acre in 1950-51 changed little during the next 10 years except in 1961. In that year, yield was up to 20,600 pounds per acre. This sudden jump was both a chance effect and a result of wider use of improved tomato varieties.

The compound effect of significant increases in yield and of reductions in plantings of tomatoes has been a relatively stable level of annual State production--between 5 and 6 million pounds. Thus the 1950 State's tomato area of 603 acres produced 5.0 million pounds while the total of only 288 acres harvested 12 years later produced 5.6 million pounds. Higher yields have resulted largely from better varieties of tomatoes developed by the Hawaii Agricultural Experiment Station specifically to suit local conditions of light, moisture, temperature, and disease.

Area of land planted in tomatoes at any one time is usually about one-half of the total area harvested annually, as two crops are normally produced in a year, though not usually on the same piece of land. Crop rotations are practiced. Successive monthly harvestings (of "mature green" tomatoes for the "fresh" market) are normally within the range of 40 to 60 acres. Planting and harvesting continue on a 12-month basis but a marked seasonal decline in harvesting occurs in the fall months (figure 1) on all major producing islands.

Island vegetable farms are generally small. They are worked intensively with family labor and only rarely with hired help. Table 2 shows the size distribution of tomato plantings per farm (under cultivation or being harvested) in the State in April, 1962. The table indicates that 29 out of the 67 farms growing tomatoes had, at that time, less than 1 acre of the crop. They accounted for only 14 acres out of the total of 99 acres in tomatoes. Another 21 farmers had between 1 and 2 acres in tomatoes while only 17 (out of 67) had 2 or more acres. These 17 relatively large growers accounted for three-fifths of the State's tomato acreage in April, 1962, while the 4 farms with 4 acres or more in tomatoes had just over a quarter of the State's total. The small scale of tomato production in Hawaii contrasts sharply with conditions in such major growing areas as California, Florida, and Texas, where tomatoes for canning and for fresh use are grown in large units. As the cost data in this report show, local tomato production is associated with heavy inputs of hand labor and low hourly earings for the family workers.

Figure 1 shows the marketing pattern in metropolitan Honolulu of tomatoes from all sources between 1958 and 1961. The marked seasonal flow of locally grown tomatoes is clearly indicated. Such marketings tend to reach a peak in the early summer months, to fall off sharply in the fall, before climbing to another less pronounced peak in early spring. Shipments from the United States Mainland (which may include some Mexican-grown tomatoes) tend to follow a reverse pattern. They fall off in the period of high local production (May-June) and are relatively high in the months of low island production. The zigzag pattern of the total monthly market supply--varying between 500,000 and 600,000 pounds--is mainly explained by the fact that shipments from the Mainland do not always arrive in a regular pattern.

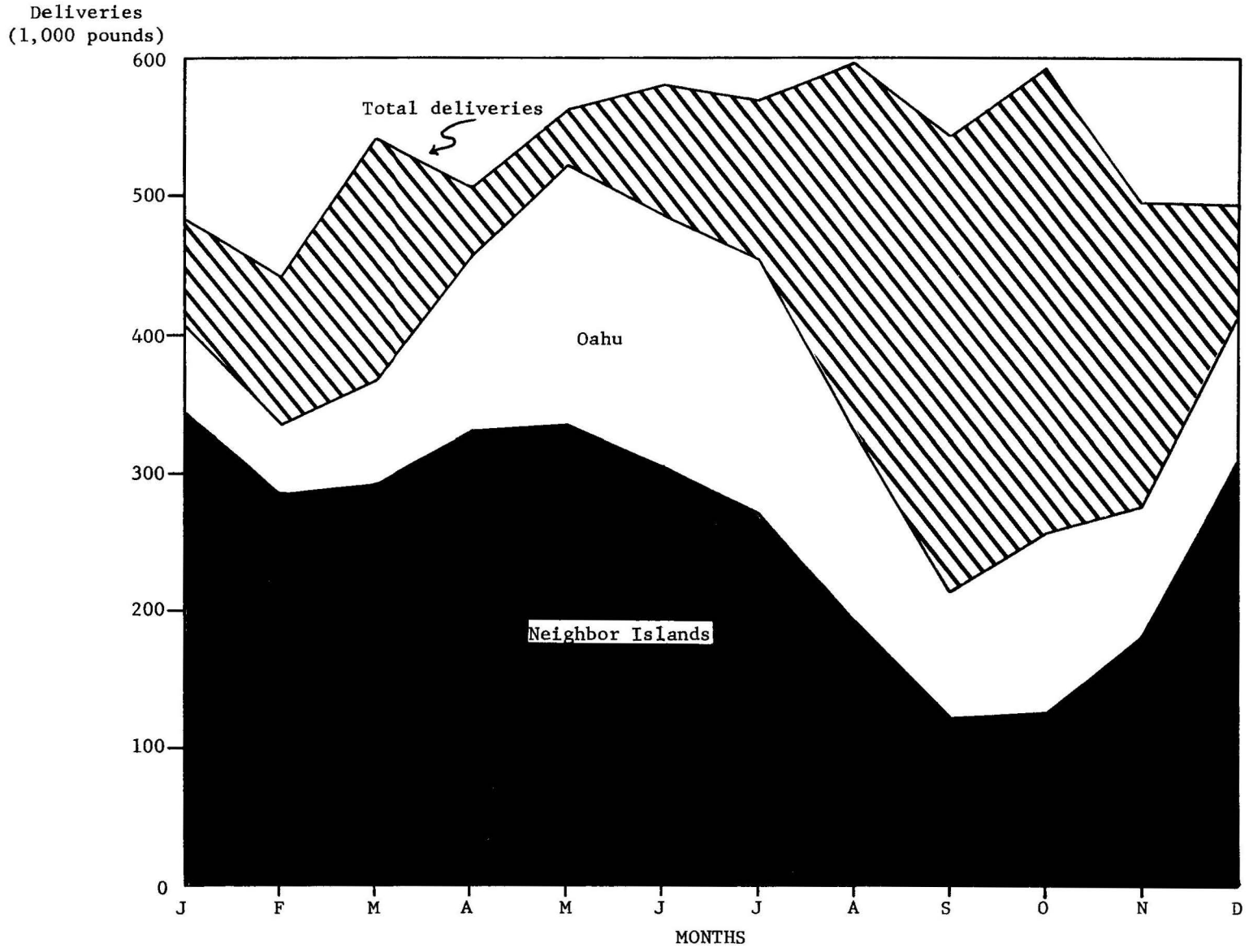

Figure 1. Average monthly deliveries of tomatoes to Honolulu from U. S. Mainland, Oahu, and Neighbor Islands, 1958-61.

Source: Hawaii Crop and Livestock Reporting Service.

Table 2. Size distribution of tomato plantings on Hawaiian vegetable farms, April, 1962

Size of plot	Number of farms	Area in tomatoes
Acres		Acres
Less than ½	7	1.65
½ - 1	22	12.35
1 - 2	21	24.75
2 - 4	13	34.00
4 and above	4	26.50
Total	67	99.25

Source: Hawaii Crop and Livestock Reporting Service, cooperating with United States Department of Agriculture.

Only in very few months during 1958-61 was the Honolulu market supplied completely with island tomatoes. Only in these particular months were local tomato prices determined by local conditions of supply and demand. Most of the time local grade 1 tomato prices are primarily based on the prices of tomatoes in Los Angeles and San Francisco plus ocean freight and handling costs. Only grade 1 quality produce is shipped from the West Coast while about 75 percent of local tomatoes are marketed in this category. Other tomatoes are grade 2 (10 percent) and MQ (market quality)--the poorest grade (15 percent).

Local tomato growers believe that they benefit from mainland imports in one important way. These imports act as a safety valve to even out fluctuations in local supplies. Island farmers cannot gain from high "scarcity" prices in the off-seasons (although some change in seasonal prices is to be expected) because the shortage in local produce is made up by an increase in mainland shipments. But when local harvests are good, mainland shipments are correspondingly cut so that local wholesale prices stay relatively stable.

Figure 2, however, shows that prices paid to farmers (Oahu farmers, in this instance) are far less stable than prices at the retail level (check the scale of the semilogarithm chart carefully). Monthly fluctuations between 1959 and 1961, for example, in prices of tomatoes at these two levels were twice as wide for prices received by Oahu growers (measured in percentage change) as for retailers. Tomato growers shipping produce from Neighbor Islands to the Honolulu market had even greater fluctuations in prices received, as extra ocean or air freight charges added to the rigidity of the "marketing margin" between the producer and the consumer. The "stickiness" of marketing margins in the Honolulu vegetable market has been discussed elsewhere.[2/] This difficulty, together with the "pocket market" situation typical of an isolated island economy, creates added production problems for the Hawaiian tomato grower.

2/ See J. A. Mollett, Cost of Producing Lettuce in Hawaii, Hawaii Agricultural Experiment Station, Agricultural Economics Report No. 54, University of Hawaii, July, 1961, pp. 6-7.

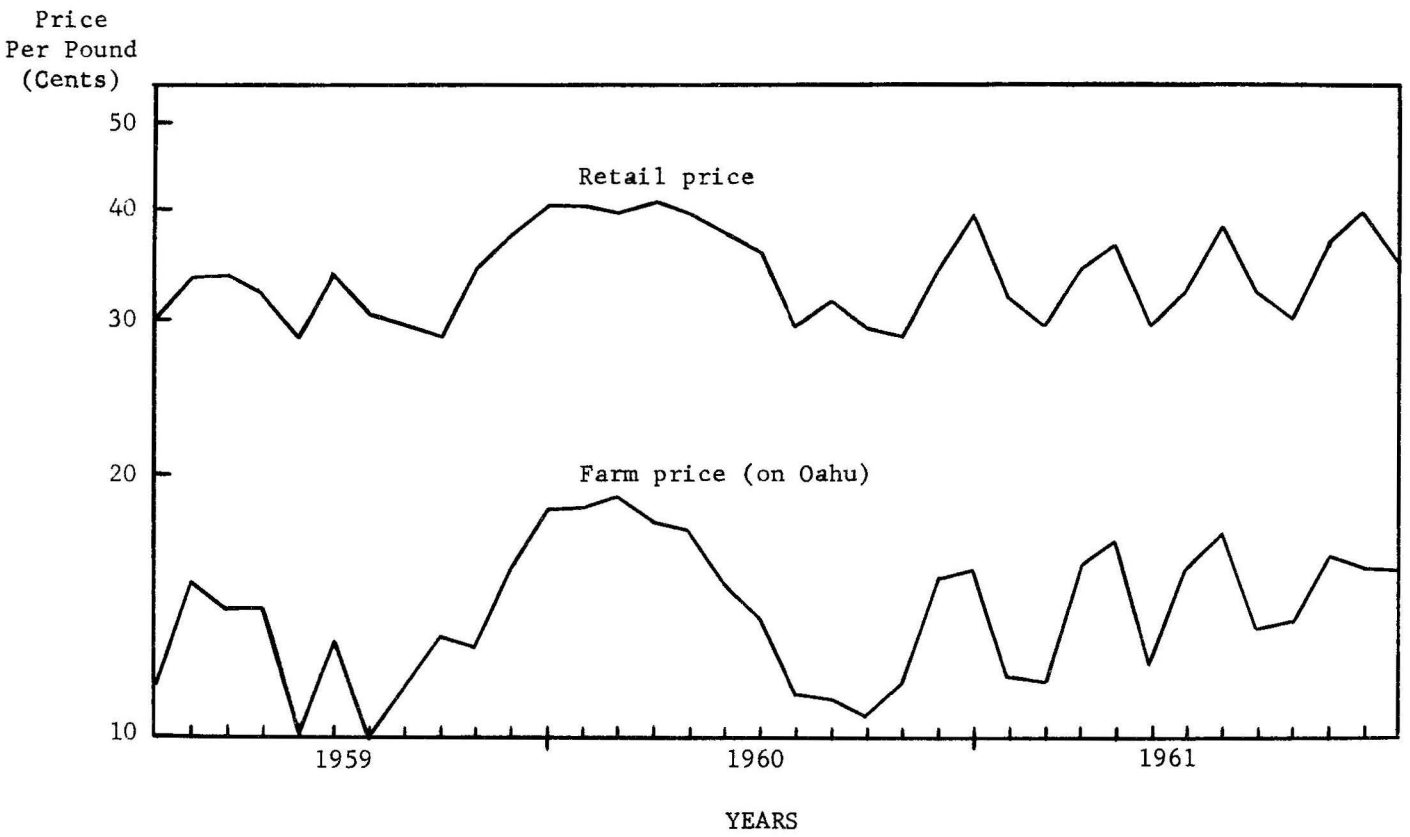

Figure 2. Retail and farm prices of tomatoes, Honolulu, 1959-61.

Source: Statistics of Hawaiian Agriculture, Hawaii Crop and Livestock Reporting Service.

COST OF PRODUCTION

Typical production costs of tomatoes have been prepared from a survey carried out on 12 farms on the islands of Hawaii, Maui, Oahu, and Kauai during June and July, 1962. The costing procedure adopted is identical to that used in similar studies carried out recently.[3/] Family labor was charged at $1.00 per hour, standard rates were used for power and equipment (see table 3), and other inputs were charged at actual cost.

Table 3 summarizes typical expenditures in producing 1 acre of tomatoes (yielding 18,000 pounds for market) on the island of Hawaii in early summer, 1962. Costs are shown on a per acre and on a per pound basis. It is important to note that per pound costs vary much more (mainly as yields change) than per acre costs on the same farm at different times of the year or on different farms at the same time. Typical relationships between per pound costs and harvested yield per acre on Hawaiian tomato production are shown later in table 5.

The typical cost of producing and marketing in Honolulu (at the wholesale stage) 18,000 pounds of tomatoes from 1 acre on the island of Hawaii is shown in table 3 to amount to $2,370 or just over 13 cents a pound. Total production costs up to the shipping stage on Hawaii amounted to $1,392 (7.73 cents per pound). Total costs of marketing from the shipping point on the island of Hawaii to the Honolulu wholesale stage amounted to $978 per acre (5.4 cents per pound).

Table 3 shows that labor amounting to $701 per acre, or 50.4 percent of total production costs, was the most important single item of production expense. A total of 246 hours was typically spent on field operations up to the harvesting stage. Harvesting, at a picking rate of 70 pounds per man-hour, took 256 hours per acre. Market preparation which includes grading, wiping, and packing the tomatoes typically took 185 hours for an 18,000-pound harvested crop, at a rate of just under 100 pounds per man-hour. Time taken to move tomatoes packed in 30-pound flats from farm to dockside naturally varied with distances involved, size of truck loads, and methods of loading. A total of 14 hours of labor was estimated as typical for this particular task.

Materials (other than gas and oil used in operating equipment) amounted to $513 per acre (2.85 cents per pound). Flats at $180 per acre were the most important single item, followed by fertilizers and manure ($115.50), fungicides ($62.40), insecticides ($47.60), string for tying the vines to stakes ($45.00), herbicides ($28.50), fumigants ($26.80), and seeds ($7.50).

Equipment costs at $113 per acre included the use of a truck ($51.00), a tractor ($25.00), stakes ($25.00), cultivating tools ($7.00), and a power spray ($4.80).

Rent at $30 per acre was charged at one-half this amount, as two vegetable crops are usually taken annually on land producing a crop of tomatoes. Taxes at $13.50 and sundries at $36.00, per acre, complete the cost structure to the shipping point on the island of Hawaii.

3/ Ibid., and Cost of Producing Cucumbers in Hawaii, Hawaii Agricultural Experiment Station, Agricultural Economics Report No. 44, February, 1960, 8 pp.

Table 3. Typical cost of producing and marketing 1 acre of tomatoes (yield of 20,000 pounds, spoilage 2,000 pounds) and 1 pound of tomatoes, island of Hawaii, 1962 (for Honolulu market)

Item	Unit	Unit cost	Units used	Cost	
				Per acre	Per pound
		Dollars		Dollars	Cents
Production Costs					
Labor					
Seedbed preparation and planting	Hour	1.00	66.00	66.00	
Growing operations	Hour	1.00	180.00	180.00	
Harvesting	Hour	1.00	256.00	256.00	(1.42)
Market preparation	Hour	1.00	185.00	185.00	(1.03)
Shipping to depot (wholesale)	Hour	1.00	14.00	14.00	
Total				701.00	3.89
Materials					
Fertilizer	100 pounds	4.20	15.00	63.00	
Manure	100 pounds	3.50	15.00	52.50	
Fumigants	Gallon	3.35	8.00	26.80	
Herbicides	Gallon	1.90	15.00	28.50	
Insecticides	Pound	.85	56.00	47.60	
Fungicides	Pound	1.30	48.00	62.40	
Seeds	Ounce	30.00	.25	7.50	
Flats	One	.30	600.00	180.00	(1.00)
String	Pound	1.00	45.00	45.00	
Total				513.30	2.85
Equipment					
Tractor	Hour	1.25	20.00	25.00	
Truck	Hour	3.00	17.00	51.00	
Power spray	Hour	.80	6.00	4.80	
Cultivation	Hour	.70	10.00	7.00	
Stakes (8-year life)	Hundred	10.00	20.00	25.00	
Total				112.80	0.63
Other expenses					
Rent	Acre	30.00	0.50	15.00	
Taxes	-			13.50	
Sundries	-			36.00	
Total				64.50	0.36
Total production costs				1,391.60	7.73
Marketing Costs					
Freight to Honolulu				132.00	(.73)
Wholesaler's commission				846.00	(4.70)
Total marketing costs				978.00	5.43
TOTAL COSTS				2,369.60	13.16

Interisland freight averaged $132 for 18,000 pounds, or 0.73 cent per pound. Wholesaler's commission in Honolulu was typically 28 percent of the wholesale price or, as table 3 shows, about 4.7 cents per pound ($846 per acre on a 18,000-pound crop).

The cost figures given in table 3 are representative only for an 18,000-pound harvested crop. On individual farms not only do harvested yields per acre vary but also the relative importance and quantity of inputs. Some farmers use no herbicides, some have to use piped water supplies, some do not stake the vines. Efficiency in harvesting and in market preparation also varies considerably from farm to farm. Spoilage losses vary from as little as 5 percent to as much as 20 percent and may even be 100 percent if storm damage (especially in winter) is severe.

It is not possible from this survey to make any clear-cut statement as to the cost advantage of tomato growing in different areas of the State. The differences in tomato production costs between farms on the same island were found to be considerable, overshadowing cost differences which might have arisen from location on different islands. The trends in tomato acreages on the different islands (table 1) reflect relative cost advantages or disadvantages, to some extent, but other factors influence these trends--such as the impact of alternative crop or livestock enterprises and land or labor availability.

Table 4 attempts to summarize the merits and demerits of the islands producing tomatoes for the major Honolulu market.

The locational advantage of Oahu tomato growers is clearly demonstrated in table 4. Situated only a short truck drive from the Honolulu market, Oahu growers have much lower freight and other marketing costs than growers on the neighboring islands. Rent which is only a small part of total production costs is, at present, not significantly different for Oahu growers than for growers on the three other supplying islands. Urban pressure is forcing a change in the State's pattern of tomato growing (table 1) so that Oahu growers' advantage of lower marketing costs is handicapped by land scarcity and the high cost of land if it has to be purchased.

Relatively dry areas on Neighbor Islands tend to hold an advantage in low incidence of disease which is counteracted to some extent by uncertain and costly water supplies. Relatively wet growing areas tend to suffer from a high incidence of disease while rain water supplies are generally adequate. Not one of the islands i free from the uncertainty of heavy winter storms which can completely ruin a crop.

A factor of paramount importance in determining the cost of producing a pound of tomatoes is yield per acre. Growing costs per acre tend to be similar whether yield is high or low. Harvesting costs are relatively stable per pound for crops of medium and high yields and slightly higher for low yielding crops. Table 5 shows a typical relationship between yield per acre and cost per pound at two stages in the production process--at the farm and at the Honolulu wholesalers. When reviewing these costs it is important to remember that labor is charged at only $1.00 per adult man-hour.

Table 4. A summary of selected cost (and related) factors in tomato production on islands supplying the Honolulu market, 1962

Factor	Islands			
	Hawaii	Maui	Oahu	Kauai
Freight, depot to wholesale, average per 1,000 pounds (dollars)	73	57	10	55
Average wholesalers' commission as percentage of Honolulu wholesale price (percent) 1/	28	28	20	28
Average yield (1959-61) per acre (pounds)	16,100	16,700	19,000	23,000
Tomato land supply (taking into account other alternatives)	Fair to good	Relatively scarce	Scarce	Relatively scarce
Water supply	Good	Erratic, droughts	Adequate	Adequate
Storm incidence in winter	Low (Kona)	High	High	High
Size of production units	Small	Small	Small	Small

1/ Spoilage and shrinkage losses on tomatoes (averaging about 10 percent) shipped from Neighbor Islands to Honolulu are considerably heavier than on tomatoes shipped from farms on the island of Oahu on which Honolulu is situated. This explains the higher proportion of the Honolulu wholesale price taken by wholesalers as commission on tomatoes shipped from Neighbor Islands to Honolulu.

Table 5. Estimated relationship between harvested yield per acre, and cost per pound, tomatoes, Hawaii, 1962

Harvested yield per acre	Cost per pound	
	At farm	At wholesalers 1/
Pounds	Cents	Cents
12,000	10.8	16.6
14,000	9.7	15.1
16,000	8.6	14.0
18,000	7.8	13.2
20,000	7.2	12.3
25,000	6.6	10.8
30,000	6.1	9.7

1/ Tomatoes shipped from island of Hawaii to Honolulu.

Cost data given in table 5 are constructed or "synthesized" from information collected on island vegetable farms relating to how and what costs change as yield changes. A careful study of this table shows that marketing costs per pound decline sharply as yield per acre rises. This relationship is based on the fact that most of the marketing charges are based on a percentage of the wholesale price received and that larger crops usually go along with lower prices.

THE MEANS OF LOWERING COSTS

The data contained in table 5 suggest one way to lower costs and that is to improve yields. Yield improvements have been considerable (table 1) in Hawaiian tomato growing during the last decade but more attention is needed to secure higher yields in the difficult winter months when prices are good locally and in the West Coast markets. Little can be done about damage from winter storms except possibly to select land for tomato growing in situations with natural or improvised protection. More can be done to breed tomatoes with even more disease resistances which still produce heavy yields of good quality produce.

Recent University of Hawaii experimental work in the Kona area has yielded encouraging results. The average harvested yield per acre with the University-bred hybrid tomato N-52 has been about 30,000 pounds per acre in the most recent season, much above the prevailing yields.

Reduction in the quantity of labor involved in tomato production appears possible, immediately, at the "market preparation" stage and, later, at the "harvesting" stage. Mechanization of the processes of cleaning, packing, and grading of tomatoes is just beginning on Hawaiian farms--either with larger machines at cooperatives or with smaller machines at individual farms. Labor released by mechanization will enable tomato growers to increase their acreage of tomatoes or of other vegetables. Mechanized tomato harvesting is still not fully out of the experimental stage on farms in California for either canning or fresh tomatoes.

The relatively small size of the family farm in Hawaii and of the individual plantings of such crops as tomatoes has encouraged a high intensity of labor use and an element of rigidity in production techniques. New developments in breeding, in fungicides, insecticides, herbicides, and the like have, so far, enabled old patterns of farming to continue. But rapid technological developments in competitive growing areas (California, Texas, and Florida) require a much greater degree of flexibility in the adoption of new production and marketing techniques. These developments are unlikely to happen fast enough in Hawaii unless farmers' attitudes towards the value of their labor changes.

Cost studies of winter and early spring tomato production in California tend to show that tomatoes cost about as much to grow in California, in the winter season, as in Hawaii. California growers, of course, have a prime location advantage in being able to ship their produce, cheaply, to the big metropolitan centers of Los Angeles and San Francisco. Island growers have to overcome this advantage by lowering production costs still more and by improving marketing.

This similarity in production costs, per pound, is not altogether unexpected, as harvesting--a major item of cost--is still largely done by hand in California. Cultural costs tend to be lower on large California farms, however.

Typical costs for winter-grown tomatoes in Imperial County (California) in 1961 were $1,484 per acre (a 14,300-pound crop) or 10.4 cents per pound, labor being charged at 90 cents per hour. This compares with about 9.6 cents per pound (14,000-pound yield, per acre) for tomatoes grown on the island of Hawaii. Tomatoes grown in the desert area of San Bernardino County, under intensive and expensive growing conditions, in 1962, yielded 60,000 pounds per ½ acre at a cost of 10.2 cents per pound, or $6,137 per ½ acre (heating by natural gas accounted for $1,438, or 23.3 percent of total production costs).

California tomatoes are grown very cheaply outside the winter months and generally much cheaper than in Hawaii. Costs per pound, for example, in 1961, of a 100-acre tomato unit on a 400-acre farm were only 4.7 cents if picked for fresh consumption (yield 20,000 pounds) and only 1.2 cents if harvested for canning (40,000 pounds). The large difference in the cost of tomatoes for "green-wrap" (fresh) and for canning is largely the result of simplified harvesting techniques which at present are used only with canning tomatoes.

Thus, Hawaii's opportunity to develop a trade in tomatoes to California, judged by production costs alone, is limited to the period from November to March or April.

Current investigations at the Molokai Demonstration Farm into economies, which may be expected by operating flexible units of 40 acres or so (7 or 8 times larger than the average family vegetable farm, at present) with new production and marketing techniques, may well show how substantial reductions in costs are possible.[4/] Cost reductions must be substantial if Hawaii is to profitably enter the West Coast winter vegetable market and to retain its current share of the local market.

Island tomato growers would have received an average net price of about 10 cents per pound (packed, f.o.b. Honolulu) for their produce if it had been sent to the U. S. Mainland in winter in recent years. This price is about 10 cents a pound less than the price received by farmers for tomatoes sold in Honolulu. The attraction of the higher local price is obvious but it is a limited attraction restricted by the relatively small local demand for tomatoes. The net mainland price relates to a winter market 15 to 16 times bigger than Hawaii's annual output of tomatoes. Relatively large increases in shipments of island tomatoes to West Coast markets would have little impact on prices there. This is the attraction of the mainland winter market although price uncertainty would still exist.

Can local growers produce winter tomatoes and have them packed and delivered in Honolulu (or Hilo) for less than 10 cents per pound? Already some farmers have produced winter crops of 30,000 pounds per acre, and more, showing that farm costs can be lowered adequately. Cost-reducing improvements in fumigation and marketing must match such gains at the farm level if a successful "break" into West Coast winter markets is to be achieved.

4/ See Douglas J. McConnell, Preliminary Studies on the Feasibility of Producing Vegetables on Molokai--I. Estimated Crop Costs and Returns: An Economic Basis for Planning Farms in the Molokai Irrigation Project Area, Progress Report No. 1 to the Tripartite Committee, Molokai Demonstration Project, Hawaii Agricultural Experiment Station, March, 1962, 70 pp.

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